

## Diseases of molluscs

### Parasitic diseases—**Infection with *Bonamia exitiosa***

#### Signs of disease

Important: animals with disease may show one or more of the signs below, but disease may still be present in the absence of any signs.

#### Disease signs at the farm level

Infection with species of *Bonamia* rarely results in clinical signs of disease in oysters. More often, the only visual cue is increased mortality.

#### Clinical signs of disease in an infected animal

Heavy infections may show:

- undergrown oysters, in poor condition
- weakened shell closure, leading to slight gaping
- watery flesh
- high mortalities of oysters in initial outbreak
- algae-covered shell lips after mantle shrinks and no longer reaches edges
- deformities to gill margins

#### Disease agent

*Bonamia* spp, including *B. exitiosa*, are protists (intrahaemocytic protozoa) of the phylum Haplosporidia that cause lethal infection of the haemocytes of certain oysters. Evidence suggests that *B. exitiosa* in New Zealand may be conspecific with *Bonamia* sp in Australia. However, until further research establishes this relationship, *Bonamia exitiosa* and the Australian *Bonamia* are currently considered to be different species.

#### Host range

Molluscs known to be susceptible to the disease:

New Zealand dredge oyster\* (*Ostrea chilensis*)  
southern mud oyster\* (*Ostrea angasi*)

\* naturally susceptible



**New Zealand flat oyster infected with *B. exitiosa*. Note typical gaping**

Source: B Diggles



**New Zealand dredge oyster (*Ostrea chilensis*) infected with *B. exitiosa***

Source: B Jones



## Infection with *Bonamia exitiosa* continued

### Presence in Asia–Pacific

While *Bonamia exitiosa* is not officially reported under the NACA–FAO–OIE quarterly aquatic animal disease reporting program, it is known to be prevalent in the region.

### Epidemiology

- Mortalities can occur all year, with highest prevalence in the mid to late summer.
- *Bonamia exitiosa* infects blood cells, destroying the immune system and interfering with other critical physiological processes.
- The disease dynamics of *B. exitiosa* in the New Zealand dredge oyster can be affected by exposure to extreme temperatures (below 7°C or above 26°C) and salinity (40‰), starvation (prolonged holding in filtered sea water), handling (vigorous stirring four times per day), or heavy infection with apicomplexan protists.
- Cohabitation of infected and uninfected oysters in holding tanks appears to promote the spread of infection.
- A seasonal pattern of disease has been observed since 1964, with two separate epizootics in 1985–1991 and 1998–2003 resulting in cumulative mortality of *Ostrea chilensis* of greater than 90%.

### Differential diagnosis

The differential diagnostic table and the list of similar diseases appearing at the bottom of each disease page refer only to the diseases covered by this field guide. Gross signs observed might well be representative of a wider range of diseases not included here. Therefore, these diagnostic aids should not be read as a guide to a definitive diagnosis, but rather as a tool to help identify the listed diseases that most closely account for the gross signs.

There are few or no visual cues to the presence of this disease, other than poor condition, shell gaping and increased mortality. It is therefore not possible to differentiate between *Bonamia* spp based on gross symptoms alone. Any presumptive diagnosis requires histological laboratory examination.

Light microscopy can further define a diagnosis, but further laboratory examination is required for a definitive diagnosis.

### Sample collection

Because of uncertainty in differentiating diseases using only gross signs, and because some aquatic animal disease agents might pose a risk to humans, you should not try to collect samples unless you have been trained. Instead, you should phone your national hotline number and report your observations. If samples have to be collected, the agency taking the call will advise you on what you need to do. Local or district fisheries/veterinary authorities could advise you on sampling.

### Emergency disease hotline

For your national emergency disease hotline number, see Whom to contact if you suspect a disease.



## Infection with *Bonamia exitiosa* continued

### Further reading

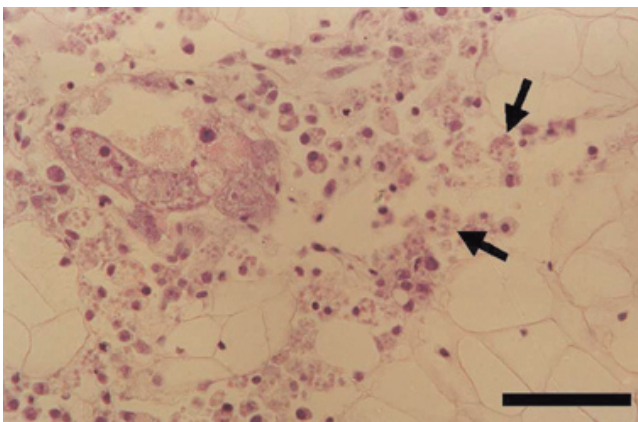
[http://www.oie.int/aac/eng/cards/en\\_diseasecard.htm](http://www.oie.int/aac/eng/cards/en_diseasecard.htm)

[http://www.pac.dfo-mpo.gc.ca/sci/shelldis/pages/bonamoy\\_e.htm](http://www.pac.dfo-mpo.gc.ca/sci/shelldis/pages/bonamoy_e.htm)

The currently accepted procedures for a conclusive diagnosis of infection with *B. exitiosa* are summarised at [http://www.oie.int/eng/normes/fmanual/A\\_00038.htm](http://www.oie.int/eng/normes/fmanual/A_00038.htm)

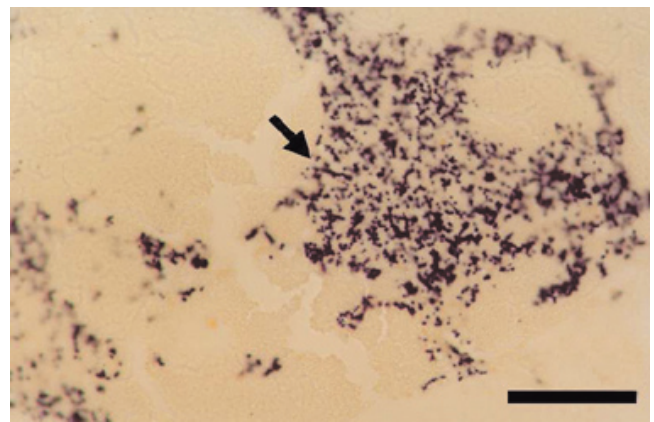
These hyperlinks were correct and functioning at the time of publication.

### Histological images



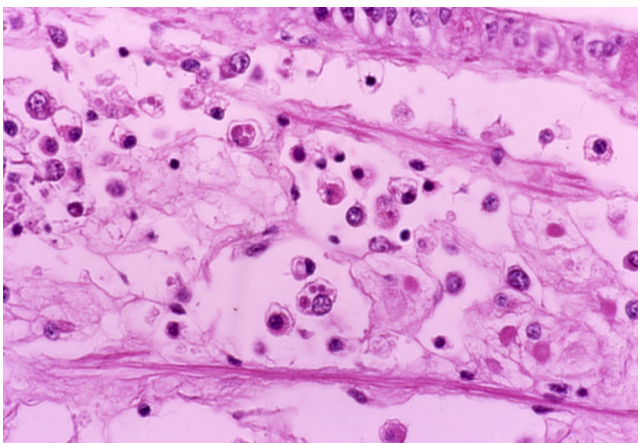
**Heavy *Bonamia exitiosa* infection in *Ostrea chilensis*, by histology**

Source: B Diggles



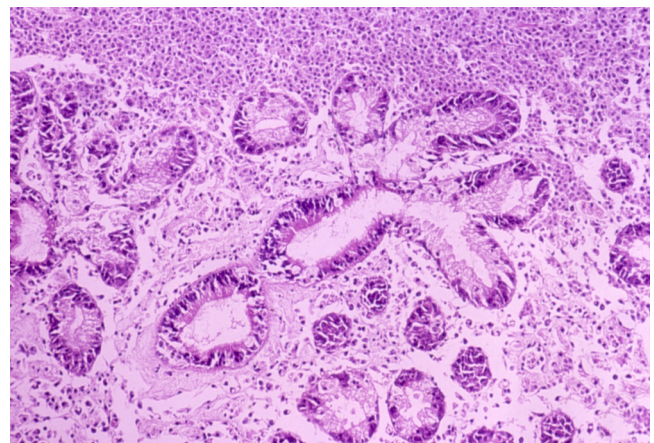
**Heavy *B. exitiosa* infection in *Ostrea chilensis*, by in situ hybridisation with a molecular probe**

Source: B Diggles



**Leydig tissue with circulating haemocytes, many of which have *Bonamia* in them (the small pink spheres in the haemocyte cytoplasm, smaller than a nucleus)**

Source: B Jones



**Inflammatory response in a section through the digestive gland of *O. chilensis***

Source: B Jones

